

SOV/76-33-2-18/45

5(4)  
AUTHORS:

Nosova, K. I., Rakov, A. A., Veselovskiy, V. I.

TITLE:

A Study of the Electrochemical Behavior of Ozone on the Platinum Electrode by the Method of Cathodic Polarography (Izucheniye elektrokhimicheskogo povedeniya ozona na platinovom elektrode metodom katodnoy polyarografii)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 2, pp 349 - 356 (USSR)

ABSTRACT:

Experimental material concerning the cathodic reduction of ozone on the rotating platinum electrode in sulfuric acid solutions at 25, 0, -30, -50 and -70°C was the basis for thorough investigations on the mechanism of the electrode reaction in the region of high anode potentials (analogous to the experiments in reference 3). The apparatus used was previously described (Ref 4). The rate of rotation of the platinum electrode was about 3000 rpm in all experiments. The stationary potential was determined as a function of the temperature at constant ozone concentration in 10 nH<sub>2</sub>SO<sub>4</sub> (Table 1) and as a function of the ozone concentration at 25°C (Table 2). The polarogram curves (Fig 1) which were obtained

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in 10 n  $H_2SO_4$  saturated with 20% ozone and at 25°C indicate a value of  $\psi_{1/2} = 1.30$  volt for the ozone reduction, while the reverse curve shows a half-wave of  $\psi_{1/2} = 1.55$  volt for the ozone reduction. The size of the limiting current is directly proportional to the ozone concentration in the solution, so that the method of cathode polarography with the rotating Pt electrode can be used for a quantitative determination of ozone in solutions and in the gaseous phase. At lower temperatures (-30 and -70°) two polarogram waves appear for the ozone reduction (Figs 3,4), which is explained in terms of a two-stage reduction reaction ( $O_3 + e^- \rightarrow O_3^-$ ;  $O_3^- + H^+ \rightarrow O_2 + OH$ ). It is assumed, on the basis of the formation of surface oxygen compounds on platinum, that the following reaction mechanism takes place:  
 $PtO + 2 OH \rightarrow PtO[O]_{ads} + H_2O$ ;  $PtO[O]_{ads} + 2H^+ + 2e^- \rightarrow PtO + H_2O$ .

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There are 4 figures, 6 tables, and 7 references, 5 of which are Soviet.

ASSOCIATION:

Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva  
(Physical-Chemical Institute imeni L. Ya. Karpov, Moscow)

SUBMITTED:

July 10, 1957

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84629

S/076/60/034/010/009/022  
B015/B064

11/13/0  
AUTHORS:

Shub, D. M., Tyurikov, G. S., and Veselovskiy, V. I.

TITLE:

Photo- and Radiation-chemical<sup>19</sup> Decomposition of <sup>27</sup>Hydrogen Peroxide in the Presence of <sup>27</sup>Iron Oxide

PERIODICAL:

Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 10,  
pp. 2245-2253

TEXT: The application of semiconductor materials as heterogeneous sensitizers in the transformation of radiation energy into chemical energy is of special importance for the utilization of nuclear radiation to initiate radiation-chemical reactions. In continuation of previous investigations, the results are given of the photo- and radiation-chemical decomposition of concentrated  $H_2O_2$  solutions with suspended  $Fe_2O_3$ . A NPK -2 (PRK-2) quartz lamp served as light source, while  $Co^{60}$  with an activity of 80 Curies was used as  $\gamma$ -radiation source; the experiments were carried out in an apparatus warranting a stabilization of temperature, good mixing of the solution, and regular irradiation. The experimental

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results obtained show that the catalytic effect of  $\text{Fe}_2\text{O}_3$  upon the  $\text{H}_2\text{O}_2$  decomposition due to light irradiation, as well as the  $\gamma$ -rays is strongly increased. This means that a chain reaction sets in on the surface of  $\text{Fe}_2\text{O}_3$  which is due to an energy transfer causing an excitation of the particles of the  $\text{Fe}_2\text{O}_3$  surface, and that the chain reaction of the  $\text{H}_2\text{O}_2$  decomposition is passed on into the liquid. The high photo- and radiation-chemical activity of  $\text{Fe}_2\text{O}_3$  can only be due to the effect of a heterogeneous sensitization (which depends on the electronic state of the semiconductor). The active centers on the  $\text{Fe}_2\text{O}_3$  surface which cause the chain reaction are the same in the thermal  $\text{H}_2\text{O}_2$  decomposition and in the decomposition due to radiation. A temperature increase accelerates in both cases the rate of decomposition. Since no particular difference was observed between the effect of the ultraviolet light and the  $\gamma$ -radiation, the reaction mechanism is assumed to be the same in both cases. Apparently, the higher energy (approximately 1.25 Mev) of the  $\gamma$ -quanta is transformed into a

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lower energy (several ev) of the light quanta, thus, causing the same excitation of the semiconductor as the light rays, so that a principal analogy exists between the effect of light and nuclear radiation. The author thanks the laboratory assistant L. G. Kazakova. There are 6 figures, 2 tables, and 11 references: 9 Soviet, 1 British and 1 French.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova  
(Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: February 19, 1959

Card 3/3

3101

S/020/60/132/04/38/064  
B004/B007

5.4600

AUTHORS: Gochaliyev, G. Z., Zalkind, Ts. I., Veselovskiy, V. I.  
TITLE: The Potential of the Platinum Electrode in an Irradiated Sulfuric Acid Solution  
PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 4, pp. 872-875

TEXT: In earlier papers (Refs. 1-4) the authors found that the potential of a Pt electrode in irradiated 0.8 N  $H_2SO_4$  (irradiation dose  $2 \cdot 10^{15}$  ev/cm<sup>2</sup>.sec) assumes a value close to that of the potential of the H electrode. The present paper deals with the results obtained by a more intensive irradiation ( $6.1 \cdot 10^{16}$  ev/cm<sup>2</sup>.sec). The experiments were carried out with a  $Co^{60}$  radiation source, and the method is described in Refs. 2 and 3. Fig. 1 shows the dependence of the potential of the Pt electrode in oxygen-free 0.8 N  $H_2SO_4$  on the duration of irradiation. Also with this intensity, selectivity of the Pt electrode with respect to the reducing radiolytic products was observed. The potential assumes a value of between

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10 and 20 mv, which remains constant up to a dose of  $2 \cdot 10^{20}$  ev/cm<sup>3</sup> and then rises up to 0.85 v (Fig. 1). For the oxidation of the reducing radiolytic products and the reduction of the oxidizing radiolytic products, occurring in the irradiated solution, the authors derive equations for the currents  $I_R$  and  $I_{Ox}$ . As the reaction constant  $k'_R$  is considerably greater than  $k'_{Ox}$  because of the selectivity of the Pt electrode, the potential observed results. By the escape of H into the gaseous phase the stoichiometric ratio between the reducing and the oxidizing products is, however, disturbed, which leads to a positive shifting of the potential in the case of high doses. Fig. 2 shows the dependence of the depolarization current at 0.4 v on the duration of irradiation. The course of this curve is explained as follows: Due to the selectivity of the Pt electrode, the oxidation of H at first predominates. As a result of the escape of H into the gaseous phase, the reduction of  $H_2O_2$  is accelerated, the total current ( $I_H - I_{H_2O_2}$ ) decreases and attains negative values in the case of doses higher than  $2 \cdot 10^{20}$  ev/cm<sup>3</sup>. If the experiment is carried out in a vessel that is hermetically sealed and completely filled with the solution so that no gaseous phase is able

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to form and no hydrogen can escape, a potential of +20 mv quickly forms, which remains constant throughout the experiment (20 h) (Fig. 3). Because of the increasing concentration of the oxidizing products, the polarization current quickly decreases (Fig. 4). The ionization of the H on the Pt electrode, which is formed by radiolysis, may therefore be carried out in the case of a steady potential only if the reduction of the oxidizing products takes place at the same rate (e.g., on a second electrode which is selective for these products). At the same time, a current will flow through the outer circuit. There are 4 figures and 7 references: 6 Soviet and 1 English.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

PRESENTED: February 26, 1960, by A. N. Frumkin, Academician

SUBMITTED: February 25, 1960

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VESELOVSKIY, V.I.

5.4600

S/020/60/133/03/10/013  
B004/B056 82275

AUTHORS: Lazorenko-Manevich, R. M., Aladzhhalova, N. A.,  
Veselovskiy, V. I.

TITLE: Electrochemical and Photoelectrochemical Processes on p-  
and n-Type Germanium in the Region of Cathodic Polarization

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 3,  
pp. 620 - 623

TEXT: The authors investigated the action of illumination on the  
separation of hydrogen on germanium. The experiments were carried out  
with samples of p-type Ge (resistivity: 0.5 - 21.0 ohm.cm) and n-type Ge  
(1.1 and 22.9 ohm.cm) in 1N KOH and 1N H<sub>2</sub>SO<sub>4</sub>. The electrode surface was  
etched with CP-4 (SR-4) or a mixture of HNO<sub>3</sub> + HF. All experiments were  
carried out in a hydrogen atmosphere. Illumination was carried out by  
means of a 300 w lamp through a 10 cm thick water layer. The light  
intensity on the electrode surface was about 10<sup>-1</sup> cal/cm<sup>2</sup>.sec. Fig. 1

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shows the typical steady curves (1 - 4) after 10 - 15 h of cathodic polarization and curve 5 for not previously polarized p-type germanium. The inflection of the polarization curves of p-type germanium at high amperages is explained by the inhibition of electron diffusion, which does not occur with n-type Ge, because the latter has a high electron concentration in the conduction band. Fig. 2 a shows the change with time in the overvoltage  $\eta$  after switching on 10 ma/cm<sup>2</sup>. The occurring maximum of  $\eta$  depends on the pretreatment of the electrode. In germanium coated with a thick oxide layer (1000 - 2000 Å), no maximum of  $\eta$  occurs. The drop of the  $\eta$ -curve after the maximum is explained by an increase in the rate of the generation of electrons on the germanium surface, which is caused by the absorption of hydrogen. During illumination of p-type Ge a rapid drop of  $\eta$  occurs due to a photoeffect. Besides, it was observed that in the presence of hydrogen this drop occurred already in the region of diffusion inhibition, which is explained by photodesorption of H. Fig. 3 shows the potential course in germanium,  $\phi(t)$ , without an external current source during illumination and in the dark. In the case of p-type Ge the

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photoeffect vanishes after a short cathodic polarization, and in n-type Ge it is intensified. Short anodic polarization no longer reduces the potential to the initial value. The authors draw the conclusion that the adsorption of hydrogen on the germanium surface increases its negative charge due to the formation of acceptor levels in the forbidden band. Molecular hydrogen does not produce this effect. The illumination of polarized p-type Ge influences the rate of gas separation in an alkaline solution (Fig. 4). Photodesorption occurs: Under the action of light the adsorbed hydrogen dissolves in the electrolyte. There are therefore two steady states: a dark state and a light state, where the latter differs from the former by the lower probability of gas-bubble formation and the higher content of dissolved hydrogen in the electrolyte. There are 4 figures and 11 references: 4 Soviet, 5 American, 1 British, and 1 German.

ASSOCIATION: Fiziko-khimicheskby institut im. L. Ya. Karpova (Physico-chemical Institute im. L. Ya. Karpov)

PRESENTED: March 10, 1960, by A. N. Frumkin, Academician

SUBMITTED: March 1, 1960

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82525

S/020/60/133/04/29/031  
B004/B056

5.4600  
AUTHORS:

Yakovleva, A. A., Borisova, T. I., Veselovskiy, V. I.

TITLE:

The Effect of Light Upon an Anode-polarized Germanium  
Electrode 9

PERIODICAL:

Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4,  
pp. 889 - 892

TEXT: It was the aim of the authors to investigate the effect of illumination upon the structure of the interface between germanium and electrolyte as well as upon the anodic dissolution of germanium. The method employed permitted illumination of the electrodes through the solution as well as of the dry side of the electrodes. (The electrode formed the bottom of a cylindrical Teflon vessel.) The experiments were carried out with monocrystalline n-type germanium of different resistivities in 0.1 N NaOH in a nitrogen atmosphere. The Ge electrodes were etched with CP-4 (SR-4). Illumination was carried out by means of an incandescent lamp within the range of 0.4 - 0.7  $\mu$ , partly with a constant current, and partly with constant voltage. It follows from Fig. 1 that

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the system was sensitive to light within the entire region of polarization. The potential barrier is removed by illumination, and the potential drops within the saturation region to the constant value of 0.5 v. Above the breakdown potential this effect stops. In the initial part of the polarization curve, the rate of the anodic reaction is not limited by the concentration of minority carriers (Fig. 2). The last-mentioned author derived equation (1):  $i = k \exp(-\Delta\psi F/RT) \cdot \exp(-\alpha \Delta H F/RT)$  for this region in an earlier paper (Ref. 7); here,  $\Delta\psi$  denotes the potential change in the volume charge of the semiconductor,  $\Delta H$  the potential change in the ionic double layer. For  $\Delta\psi$ , there further exists the dependence (2) on carrier concentration on the surface:  $C_{\text{surf}} = C_{\text{volume}} \exp(-ne\Delta\psi/RT)$ . All factors influencing the surface concentration of electrons and holes must therefore also influence  $\Delta\psi$  and the total potential difference  $\Delta\psi$ . Fig. 3 shows  $\Delta i_{\text{light}}$  and  $\Delta\phi_{\text{light}}$  as function of the intensity of illumination.  $\Delta i_{\text{light}}$  increases proportional to the absorbed light quanta.  $\Delta\phi_{\text{light}}$  rises exponentially in the initial part of polarization, and tends toward a limit with a saturation current.

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Table 1 gives the quantum yield  $K$  for various intensities of the absorbed radiation in the case of a saturation potential. Table 2 shows the values of  $K$  for two intensities.  $K$  has a maximum in the saturation range. The results obtained by illuminating the dry side of the electrode are shown in Fig. 4, namely  $\Delta i_{\text{light}}$  as a function of  $1/l$ , the reciprocal value of the thickness of the electrode.  $\Delta i_{\text{light}}$  grows linearly with  $1/l$ . No differences between the two kinds of illumination could be found. Also in the illumination of the dry side of the electrode, a potential drop occurred with electrode thicknesses that were a multiple of the diffusion length of the minority carriers. There are 4 figures, 2 tables, and 7 references: 2 Soviet, 4 American, and 1 German. ✓

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova  
(Physicochemical Institute im. L. Ya. Karpov)

PRESENTED: March 18, 1960 by A. N. Frumkin, Academician

SUBMITTED: March 18, 1960

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33122

S/638/61/001/000/053/056  
B125/B104

S.4500  
24,3500 (1137, 1138)

AUTHORS: Shub, D. M., Tyurikov, G. S., Veselovskiy, V. I.

TITLE: Heterogeneous sensitization of radiochemical processes on the semiconductor - solvent interface

SOURCE: Tashkentskaya konferentsiya po mirnomy ispol'zovaniyu atomnoy energii. Tashkent, 1959. Trudy. v. 1. Tashkent, 1961, 370-377

TEXT: Data on the radio-electrochemical process in  $\text{Co}^{60}$  gamma irradiation (activity  $\sim 20,000$  g-equ. Ra) of a  $\text{Cu}\cdot\text{Cu}_2\text{O}$  electrode in a 0.1 KOH solution are presented. The action of the optical radiation of a 500-watt bulb under the same conditions is compared. The system  $\text{Cu}\cdot\text{Cu}_2\text{O}$ -KOH solution was irradiated after 3-hr saturation with nitrogen. The radio-electrochemical effect was first determined only from the change of the electrode potential under the simultaneous action of cathode current and radiation from  $\Delta V_c = V_c - V_T$  at  $I = \text{const}$  for potentials between 0.770 v and 0.200 v.

The potential was shifted toward more positive values by irradiation.  $V_c$  and  $V_T$  denote the electrode potential during and after irradiation,

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# Heterogeneous sensitization ...

respectively. Visible light and gamma rays apparently give rise to similar excitation processes in the semiconductor, with the absolute values of  $\Delta V_c$  under gamma irradiation being higher than with visible light. Fig. 2 shows the typical dependence of potential change on the duration of irradiation for an initial potential of 0.200 v. For the other initial potentials examined, the curve shape was similar, but the absolute values of  $\Delta V_c$  were lower. The potential jump at the beginning and the following slow approach of the potential to the steady state are due to the excitation of the semiconductor and to the electrochemical oxidation, respectively. The components ( $\text{OH}$ ,  $\text{O}_2$ ) appearing in the radiolysis of water speed up the electrochemical reaction. The experimental results available so far are not sufficient to back the assumption of a specific mechanism for the radio-electrochemical process on the  $\text{Cu}\cdot\text{Cu}_2\text{O}$  electrode. They suffice, however, for the following hypothesis: Due to the action of radiation,  $\text{Cu}_2\text{O}$  can be oxidized to  $\text{Cu}(\text{OH})_2$ : hydrogen peroxide may also be produced by a sensitized reaction involving the oxygen which is always present in  $\text{Cu}_2\text{O}$ . The radio-electrochemical process on the  $\text{Cu}\cdot\text{Cu}_2\text{O}$  electrode is of interest also for heterogeneous radiation sensitization.

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# Heterogeneous sensitization ...

A noticeable sensitization, however, is only possible in the case of a sufficiently large acting surface of the sensitizer. According to data available on the damping of luminescence (see also Veselovskiy V. I., Miller N. B., Shub D. M. Sbornik rabot po radiatsionnoy khimii, M., AN SSSR, 49, 1955; Shub D. M., Tyurikov G. S., Veselovskiy V. I., Trudy I Vsesoyuznogo soveshchaniya po radiatsionnoy khimii, M., AN SSSR, 161, 1958), the energy of excitation of a semiconductor by electrons can be transferred to the solution components. A participation of excited electrons of the semiconductor with more than 3.0 ev in the reaction, and an excitation of radio-chemical processes by the energy absorbed and converted by the semiconductor are possible. The rate of disintegration under the action of irradiation is considerably increased by the presence of an  $Fe_2O_3$  suspension. In a microheterogeneous system, the suspension  $Fe_2O_3-H_2O_2$  solution is not substantially changed by radiation, and, therefore, the rate of hydrogen peroxide decomposition does not change either. The heterogeneous process depends on the electron state of the semiconductor, and the active surface centers determining the reaction are of the same nature during decomposition due to heat and irradiation. The

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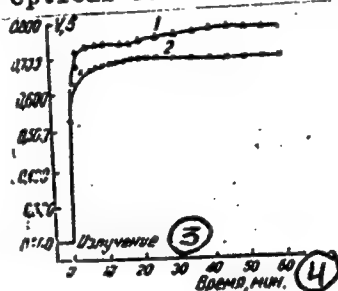
# Heterogeneous sensitization ...

experimental data fit the said hypothesis and are indicative of the possible excitation of heterogeneous sensitization processes. There are 5 figures, 1 table, and 8 references: 7 Soviet and 1 non-Soviet.

ASSOCIATION: N.-i. fiziko-khimicheskiy institut im. L. Ya. Karpova  
(Scientific Physicochemical Research Institute imeni L. Ya. Karpov)

Fig. 2. Dependence of the potential change of a Cu-Cu<sub>2</sub>O electrode on the duration of irradiation.

Legend: (1) gamma radiation; (2) optical radiation; (3) radiation;  
(4) time, min.



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S/076/61/035/010/004/015  
B101/B110

26.2510 (40 1208)

AUTHORS: Rozental', K. I., and Veselovskiy, V. I. (Moscow)

TITLE: Kinetics of the electrochemical reactions of oxidation and reduction of  $H_2$ ,  $O_2$ , and oxyhydrogen gas on a platinum electrode in electrolyte solutions

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 10, 1961, 2256-2264

TEXT: The authors describe a method of measuring the effective rate of  $H_2$  oxidation,  $O_2$  reduction, and "combustion" of oxyhydrogen gas on a platinum electrode, based on gas consumption. A confrontation is made with data found earlier by polarography (Ref. 11: K. I. Rozental', V. I. Veselovskiy, Zh. fiz. khimii, 31, 1555, 1732, 1957). Fig. 1 shows the experimental arrangement. The electrode to be tested is placed in the central part A, and the auxiliary platinum electrode B is situated in the lateral ramifications along with the reference electrode C (Pd sheet saturated with  $H_2$ ). The electrode to be tested consisted of a platinum net wrapped around a glass tube which was caused to rotate at 700 rpm by a magnetic field. A was filled with electrolyte (1 N  $H_2SO_4$ ; 1 N  $HClO_4$  or 1 N KOH) which was

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saturated with the respective gas mixture ( $H_2 : N_2 = 2 : 1$ ;  
 $O_2 : N_2 = 1 : 2$ ;  $H_2 : O_2 = 2 : 1$ ) at atmospheric pressure and  $20^\circ C$ . For  
the preparation of gas mixtures and electrolytes, see Ref. 11. After the  
desired potential was attained by polarization, the gas volume that entered  
in the burette D at the beginning and end of the experiment. The rate  
 $\omega$  ( $cm^3/hr$ ) of the electrochemical reaction was measured as a function of  
the potential  $\varphi$ . The following was found: (1)  $\omega_{H_2}$  in 1 N  $H_2SO_4$  amounted

to  $\sim 1 cm^3/hr$  between 0.15 and 0.8 v. On a passivated anode (0.9-1.4 v),  
 $\omega_{H_2}$  still was 50-30% of the maximum rate, and thus was higher than had  
been found in Ref. 11 by polarography. The oxidation of  $H_2$  on a passivated  
electrode was assumed to take place by interaction with chemisorbed  $O_2$  which  
was either set free electrochemically or entered from the gaseous phase  
(in case of oxyhydrogen gas). (2)  $\omega_{O_2 max}$  was twice as high in acid solu-

tions as in alkaline ones. The values based on gas consumption agreed with  
those based on current consumption. (3) The rate of reaction of oxyhydrogen  
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B101/B110

Kinetics of the electrochemical ...

gas depended on the electrode potential, on the type of anion, and on the pH of the solution. In case of a steady potential ( $i = 0$ ), the "combustion" rate of oxyhydrogen gas in 1 N  $H_2SO_4$  ( $\eta = 0.6-0.8$  v) approaches the maximum rate, and is almost twice that in 1 N  $HClO_4$ , and three times that in 1 N  $KOH$  ( $\eta_{HClO_4}$  and  $\eta_{KOH} = 0.6$  v). The assumption that  $H_2$  ionization and  $O_2$  reduction in oxyhydrogen gas take place independently of each other is valid with restrictions (for  $KOH$ , and in part also for  $HClO_4$ ). In general, these processes exert a reciprocal influence, and give rise to either an increase of the rate (with  $H_2SO_4$ ) or to an inhibition of  $H_2$  ionization (with  $HClO_4$ ). G. A. Petrov assisted in the work. There are 7 figures and 16 references: 9 Soviet and 7 non-Soviet. The two most recent references to English-language publications read as follows: M. J. Joncich, N. Hackerman, J. Phys. Chem., 57, 674, 1953; J. M. Kolthoff, J. Jordan, J. Amer. Chem. Soc. 74, 570 and 4801, 1952.

SUBMITTED: February 11, 1960

Card 3/4

TRUSOV, G.N.; ALADZHALOVA, N.A.; VESELOVSKIY, V.I.

Separation of hydrogen isotopes on a palladium cathode. Dokl. AN  
SSSR 138 no.6:1385-1388 Jo '61. (MIRA 14:6)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova. Predstavleno  
akademikom A.N.Frumkinym.  
(Hydrogen--Isotopes)

IZIDINOV, B.C.; BORISOVA, T.I.; VESELOVSKIY, V.I.

Electrochemical and photoelectrochemical behavior of the silicon  
electrode in acid and alkaline solutions. Zhur. fiz. khim. 36  
no.6:1246-1254 Je'62 (MIRA 17:7)

1. Fiziko-khimicheskiy institut imeni Karpova, Moskva.



MAZITOV, Y.I.A.; ROZENTAL', K.I.; VESELOVSKIY, V.I.

Ionization of oxygen at a three-phase boundary in alkaline  
solutions. Zhur. fiz. khim. 38 no.2:449-455 P '64.  
(MIRA 17:8)

1. Fiziko-khimicheskiy institut imeni Karpova.

MAZITOV, Yu.A.; ROZENTAL', K.I.; VESELOVSKIY, V.I. (Moscow)

Ionization of oxygen at a three-phase boundary in alkaline  
solutions. Zhur. fiz. khim. 38 no.3:697-701 Mr '64.  
(MIRA 17:7)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.

MAZITOV, Yu.A.; ROZENTAL', K.I.; VESELOVSKIY, V.I.

Oxygen ionization on a silver electrode in alkaline solution.  
Elektrokhimiia 1 no.1:36-40 J '65. (MIRA 18:5)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L.Ya.  
Karpova, Moskva.

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L 48967-65  
ACCESSION NR. AP5007749

electrolyte was KOH from the 13.3 mmol/l. 10% highly pure KOH solution with a content of  $2.4 \cdot 10^{-5}$  imp. The test was conducted at  $25 \pm 0.2^\circ\text{C}$  mercury. Before the tests the electrolyte was further purified by the following purification at a large scale. The test was repeated at  $25 \pm 0.2^\circ\text{C}$  mercury. The results did not change if

figures.

ASSOCIATION: Fiziko-khimicheskiy institut imeni L. Ya. Karpova (Physical-Chemical

SUBMITTED: 10Jun64

ENCL: 00

SUB CODE: GC

VESELOVSKAYA, V.I.

Several features of the geography of the rural nonagricultural  
populated localities of Vologda Province. Izv. Vses. geog.  
ob-va 96 no.6:488-494 N-0 '64 (MIRA 18:1)

MAZITOV, Yu.A.; ROZENTAL', K.I.; VESELOVSKIY, V.I. (Moscow)

Anodic formation and cathodic removal of oxides on palladium.  
Zhur. fiz. khim. 38 no.1:151-155 Ja'64. (MIRA 17:2)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.

SHEPELIN, V.A.; ZALKIND, TS.I.; VESELOVSKIY, V.

Steady-state reduction of oxygen on a platinum cathode in alkaline solution. Zhur.fiz.khim. 38 no.8:2098-2101 Ag '64.

(MIRA 18:1)

1. Fiziko-khimicheskiy institut imeni P.Ya.Karpova.



ACCESSION NR: AP4011448

S/0076/64/038/001/0151/0155

AUTHORS: Mazitov, Yu. A. (Moscow); Roszental', K. I. (Moscow);  
Veselovskiy, V. I. (Moscow)

TITLE: Anodic formation and cathodic removal of oxides on palladium

SOURCE: Zhurnal fiz. khim, v. 38, no. 1, 1964, 151-155 .

TOPIC TAGS: anodic palladium oxidation, cathodic palladium reduction

ABSTRACT: The scarcity of work on the anodic behavior of Pd prompted this study. The authors investigated the formation and reduction of palladium oxides in 10.6 N KOH at different temperatures by plotting the curve of cathode charge after prior polarization of the electrode with different potentials. It has been found that beginning with 1.05 v anode potential, the Pd surface becomes coated with a divalent Pd oxide, or at the potential of oxygen liberation with two different oxides. It is supposed that the second is a peroxide. The rate of oxide decomposition rises with the temperature, and the stability of the first oxide is greater than of the second. It was found that the slope of the Tafel equation for cathodic reduction of both oxides

Card 1/2

ACCESSION NR: AP4011448

is 55 mv. The formation of an overvoltage resulting from the reduction of the second oxide has been observed and it is attributed to concentrated polarization in the oxide layer. Orig. art. has 3 Figures

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova  
(Physico-chemical Institute)

SUB CODE: OH

DATE ACQ: 14Feb64

ENCL: 00

SUBMITTED: 17Apr63

NR REF SOV: 001

OTHER: 011

2/2

Card

VESELOVSKIY, V.I.; BORISOVA, T.I.; YAKOVLEVA, A.A.; IZIDINOV, S.O.

"Some Specific Features of the Double Layer Structure and Electrode Process on Elemental and Oxide Semiconductors Ge, Si,  $\text{Ag}_2\text{O}$ ,  $\text{Ta}_2\text{O}_5$ ,  $\text{TiO}_2$ ."

Report presented at the 11th meeting CITCE, Intl. Com. of Electrochemical Thermodynamics and Kinetics, Moscow, 19-25 Aug 63.

Karpov Physico-Chemical Institute, Moscow, U.S.S.R.

ROZENTAL', K.I.; VESELOVSKIY, V.I.; Prinimal uchastiye: PETROV, G.A.  
(Moscow)

Kinetics of the electrochemical oxidation and reduction of  
 $H_2O_2$  and oxyhydrogen on an Au electrode in  $N H_2SO_4$  solution.  
Zhur.fiz.khim. 35 no.11:2481-2486 N '61. (MIRA 14:12)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.  
(Hydrogen)  
(Oxygen)  
(Oxidation-reduction reaction)

S/844/62/000/000/028/129  
D244/D307

AUTHOR: Veselovskiy, V. I.

TITLE: Radiation-electrochemical processes in aqueous solutions

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 171-175

TEXT: The appearance and evolution of stationary radiation-electrochemical processes is described. The process of changing the electrode potentials was carried out in aqueous  $H_2SO_4$ , under the action of  $\gamma$  rays, using gold and platinum electrodes. The Pt electrode potential drops from about 0.9 v to 0.05 v (stationary potential) after 30 hours and that of the Au electrode increases slowly from about 0.7 v to 0.9 v (stationary potential). The fall of the Pt electrode potential to a value near that of the hydrogen electrode is explained by the selectivity of the Pt electrode in respect to the radiolysis products of water ( $H$  and  $H_2$ ). Stationary potentials of a metal electrode reached under the action of radiation of a

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Radiation-electrochemical ...

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given intensity are given by

$$\varphi_{\text{stat}} = \frac{\varphi_{\text{Ox}}^0 + \varphi_{\text{red}}^0}{2} + \frac{RT}{2dF} \ln \frac{k'_{\text{Ox}} [\text{Ox}]}{k'_{\text{red}} [\text{red}]},$$

where  $\varphi_{\text{Ox}}^0$  and  $\varphi_{\text{red}}^0$  are the values of stationary potential for the oxidizing and reducing components respectively and the  $k'_{\text{Ox}}$  and  $k'_{\text{red}}$  are respectively the rate constants for the electrochemical oxidation and reduction processes. The total ionization flow in the Pt electrode in an uninsulated system increases with the radiation dosage to about  $0.1 \text{ ev/ml} \times 10^{21}$  and then decreases to a value below zero. The crossing of the zero line indicates that considerable ionization of  $\text{H}_2\text{O}_2$  takes place. The ionization current in the Pt electrode in an insulated system reaches the maximum value rapidly

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Radiation-electrochemical ...

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D244/D307

and then falls slowly to a value slightly above zero. For the Au/Pt electrodes acting separately and selectively to oxidizing and reducing components the current remains constant (about 6 mka/cm<sup>2</sup>) indefinitely. The power yield in the processes does not exceed 2 - 3% of the absorbed radiation energy. There are 3 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute im. L. Ya. Karpov)

Card 3/3

S/844/62/000/000/030/129  
D244/D307

AUTHORS: Gochaliyev, G. Z., Zalkind, Ts. I. and Veselovskiy, V. I.

TITLE: The radiation electrochemical processes in oxygen-bearing aqueous solutions of sulphuric acid

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 183-187

TEXT: The authors investigated radiation-chemical processes in  $O_2$ -containing solutions to obtain additional data on the intermediate reaction products. The experiments were conducted at  $10^\circ C \pm 1^\circ C$  with a rotating Pt electrode and a dropping Hg electrode immersed in  $0.005\text{ N } H_2SO_4 + 0.5\text{ N } Na_2SO_4$  containing  $O_2$ . The irradiation dosage was  $4 \times 10^{16}$  ev/ml.sec. On irradiation there appear two waves in the polarization curve for the Pt electrode, occurring at 0.76 and 1.6 v, corresponding to the oxidation of  $H_2O_2$  formed

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The radiation ...

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D244/D307

during irradiation, and the value of the limiting current at the reducing potentials of  $O_2$  is increased. Fifty minutes after the beginning of irradiation, stationary currents are established, corresponding to the oxidation of  $H_2O_2$ . After the end of irradiation, current decreases in both cases, which is ascribed to the disappearance of intermediate reaction products capable of being oxidized at the same potentials as  $H_2O_2$  and reduced at the reduction potential of  $O_2$  at the Pt electrode. For the dropping Hg electrode there are also two polarization waves, the first of which corresponds to the reduction of  $O_2$  to  $H_2O_2$  through the intermediate stage of  $HO_2$  formation, and the second corresponding to the reduction of  $H_2O_2$  to  $H_2O$ . An increase in the current during irradiation takes place both at the reduction potentials of  $O_2$  and at that of  $H_2O_2$ . For the Pt electrode, the current decreases at the reduction potentials of  $O_2$  after the irradiation is cut off. The stationary con-

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The radiation ...

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centration of  $H_2O_2$  obtained during the irradiation was calculated. With decreasing concentration of  $H_2O_2$  ( $1.64$  to  $1.18 \times 10^{-3}$ ) the concentration of the intermediate products falls from  $3.4 \times 10^{-4}$  to  $1.6 \times 10^{-4}$  M. There are 5 figures and 1 table.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Phy-  
sico-Chemical Institute im. L. Ya. Karpov) ✓

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S/844/62/000/000/031/129  
D244/D307

AUTHORS: Shub, D. M., Belokopytov, V. P. and Veselovskiy, V. I.

TITLE: Investigation of radiation-chemical processes using semiconductor electrodes

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 188-192

TEXT: The system Cu . Cu<sub>2</sub>O/KOH solution was investigated to determine whether semiconductor electrodes transform the absorbed energy of irradiation into electronic excitation energy, as is currently believed. The solution (0.1 N KOH) containing the Cu·Cu<sub>2</sub>O-electrode was irradiated with  $\gamma$  rays from a Co<sup>60</sup> source with an activity of about 20,000 g-equiv. Ra, and with visible light (500 W lamp). Under the irradiation, a shift of the Cu·Cu<sub>2</sub>O-electrode potential (in the region of 0.2 - 0.7 v) in the positive direction, was observed. A reverse effect was observed in the region of 0.8 -

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Investigation of radiation- ....

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1.7 v. Detailed analysis of the results in the region of 0.2 - 0.7 v showed that irradiation promoted an electrochemical reaction on the electrode surface, which led to the oxidation of  $\text{Cu}_2\text{O}$ . Reduction of the products of the oxidizing reaction and return of the electrode to its original state takes place by means of cathodic polarization. The oxidation reaction occurs as a result of absorption of the irradiation energy by  $\text{Cu}_2\text{O}$ . The results are interesting from the point of view of the elucidation of the possibility of reaching a stationary potential difference under the influence of ionizing radiation, since the  $\text{Cu}\cdot\text{Cu}_2\text{O}$  electrode then assumes a sufficiently high and stable anodic potential. There are 4 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute im. L. Ya. Karpov)

Card 2/2

S/844/62/000/000/032/129  
D244/D307

AUTHORS: Miller, N. B., Veselovskiy, V. I. and Borotyntsev, V. A.

TITLE: Investigation of the mechanism of radiation-electrochemical processes in aqueous solutions of uranium salts

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by. L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 193-198

TEXT: Solutions of hexavalent U and mixtures of  $U^{VI}$  and  $U^{IV}$  were investigated to elucidate the mechanism of radiation-electrochemical conversions, using Pt, Au and Hg electrodes. The method used was that described previously (Collection: Deystviye ioniziruyushchikh izlucheniya na neorganicheskiye i organicheskiye sistemy, Izd-vo AN SSSR, 1958, p. 93 (The action of ionizing radiation on organic and inorganic systems.)). On irradiation the Pt electrode potential in a solution containing  $U^{IV}$  assumes a value about 20 mv lower than zero (w.r.t. the hydrogen electrode). The effect is accompanied by

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Investigation of the ...

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vigorous evolution of  $H_2$  resulting from the presence of  $U^{IV}$ , which acts as an OH acceptor and prevents the recombination of H and OH. In the presence of  $U^{VI}$  and  $U^{IV}$  there is some formation of  $U^V$  by the reduction of  $U^{VI}$  and oxidation of  $U^{IV}$ . The yield of  $U^V$  in solutions containing only  $U^{VI}$  was about 4 ions/100 ev, and in those containing both  $U^{VI}$  and  $U^{IV}$  it was 8 ions/100 ev. Stationary concentrations of  $U^V$  in the solutions were found to be in the ratio of  $\frac{1}{\sqrt{2}}$ . Study of depolarization currents at a Pt electrode potential of 0.4 v, the electrode being immersed in the uranyl solutions irradiated with  $4 \times 10^{16}$  ev/ml.sec, showed that for a given dosage the lower concentration limit, corresponding to approximately complete capture of H by the uranyl ions, is  $5 \times 10^{-2}$  M. Study of the formation of  $U^{VI}$  and  $U^V$  on the oxidation of  $U^{IV}$  solutions showed that for increasing

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Investigation of the ...

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D244/D307

concentration of  $U^{IV}$  the stationary concentration of  $U^V$  becomes greater. Radiation yields  $G(U^V)$  were found to be 2.1, 1.5, 1.06 per 100 ev of absorbed radiation for 0.1, 0.2 and 0.4 M solutions of  $U^{IV}$  respectively. The stationary concentrations of  $U^V$  were  $1.2 \times 10^{-4}$ ,  $2.2 \times 10^{-4}$  and  $3 \times 10^{-4}$  M for the same solutions. There are 5 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute n. Ya. Karpov)

Card 3/3

S/844/62/000/000/045/129  
D287/D307

AUTHORS: Shub, D. M., Belokopytov, V. P. and Veselovskiy, V. I.

TITLE: Investigations of the radiolytic oxidation of organic substances sensitized with semiconductors

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd vo AN SSSR, 1962, 269-273

TEXT: Possible methods were investigated for increasing the yield of products during the radiolysis of organic substances, by using the system ZnO (suspension) - potassium oxalate (aqueous solution). The marked effect of heterogeneous sensitization can only be observed when the active surface of the sensitizer is sufficiently large. ZnO suspensions in aqueous potassium oxalate were therefore used, being continuously agitated during irradiation (800 rpm). Oxygen or nitrogen were led through the solution (40 ml/min) and the reaction temperature kept constant at 20°C. After irradiation the concentrations of  $K_2C_2O_4$  and  $H_2O_2$  were determined and compared with

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Investigations of the ...  
 data obtained for solutions not containing ZnO. The samples consisted of 50 ml of  $5.0 \times 10^{-3}$  N  $K_2C_2O_4$  solution (containing 1 g ZnO).  
 Investigations on the relationship between the decomposition of  $K_2C_2O_4$  and the time of irradiation showed, in the presence of oxygen, that the rate of decomposition increased noticeably in the presence of ZnO. The yields also increased (4.7 mol/100 ev as against 2.8 mol/100 ev in homogeneous solutions) in the presence of ZnO but no marked discrepancies in the yield of  $H_2O_2$  could be recorded in the presence or absence of the suspension (2.4 and 2.2 respectively). The gaseous phase did not contain any  $CO_2$  and it is suggested that the  $CO_2$  is absorbed by the solution, increasing its pH. This increase could also be observed during irradiation for e.g. 5 hours. Decomposition yields were much higher when the experiments were carried out in a current of nitrogen; increased reaction rates were also recorded but no  $H_2O_2$  could be detected. A linear relationship

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Investigations of the ...

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exists between the decomposition of  $K_2C_2O_4$  and the quantity of  $ZnO$  in the solution when the solution is irradiated for 20 min. The reaction is thus heterogeneous. Heterogeneous sensitization processes may, therefore, constitute one method for utilizing nuclear radiation more effectively in chemical reactions. There are 4 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute im. L. Ya. Karpov)

Card 3/3

IZIDINOV, S.O.; BORISOVA, T.I.; VESELOVSKIY, V.I.

Particular features of the photoelectrochemical behavior of the  
silicon-alkali interface. Dokl.AN SSSR 145 no.3:598-601 JI '62.  
(MIRA 15:7)

1. Fiziko-khimicheskiy institut imen' L.Ya.Karpova. Predstavleno  
akademikom A.N.Frumkinym.  
(Silicon) (Alkali) (Photochemistry)

YAKOVLEVA, A.A.; BORISOVA, T.I.; VESELOVSKIY, V.I.

State of germanium electrode surface in the process of anodic solution. Dokl.AN SSSR 145 no.2:373-376 JI '62. (MIRA 15:7)

1. Fiziko-khimicheskiy institut imeni L.Ya.Karpova. Predstavleno akademikom A.N.Frumkinym.  
(Germanium--Electric properties)

24.7000

L2168  
S/076/62/036/011/018/021  
B101/B180

AUTHORS: Yakovleva, A. A., Borisova, T. I., and Veselovskiy, V. I.

TITLE: State of surface and mechanism of self-dissolution of germanium in hydrogen peroxide solutions

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 11, 1962, 2541-2544

TEXT: The dependence of the potential, photoeffect, and capacitance on the  $H_2O_2$  concentration in 0.1 N NaOH was studied on n-type and p-type germanium (5 ohm·cm) (Fig. 2). Corresponding to the maximum dissolution rate at 0.5 moles/liter of  $H_2O_2$ , maximum capacitance also occurs at this concentration. f

The anodic polarization curves showed maximum saturation current at the lowest  $H_2O_2$  concentration. These data suggest that the etching of

germanium in alkaline hydrogen peroxide solutions proceeds via a stage of GeO formation, and is electrochemical in nature, since  $H_2O_2$  is reduced on the cathode and Ge is dissolved on the anode. With a high  $H_2O_2$  excess, however, GeO oxidizes to  $GeO_2$ , and the dissolution process is inhibited.

Card 1/2

State of surface and mechanism!...

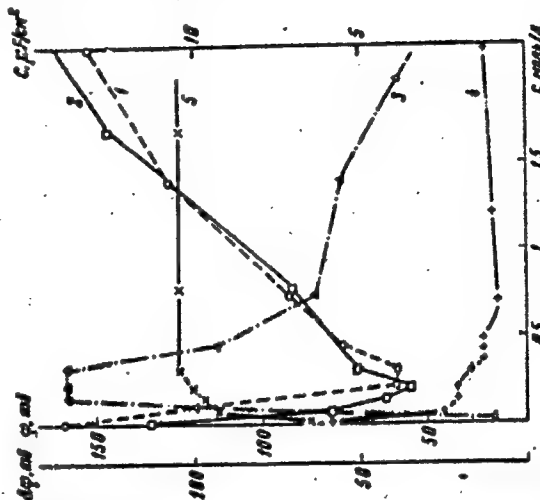
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B101/B180

There are 3 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: April 6, 1962

Fig. 2. Variation in potential, photoeffect, and capacitance of Ge electrode at different  $H_2O_2$  concentrations in 0.1 N NaOH; Potential of (1) n-type Ge; (2) p-type Ge; (3) capacitance (1 kc/sec); (4) photoeffect of n-type Ge; (5) photoeffect of p-type Ge; abscissa:  $H_2O_2$  concentration, moles/liter.



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39579  
S/020/62/145/003/011/013  
B101/B144

AUTHORS: Izidinov, S. O., Borisova, T. I., and Veselovskiy, V. I.

TITLE: Characteristics of the photochemical behavior of the silicon-alkali interface

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 3, 1962, 598-601

TEXT: Exposure of the Si - KOH interface to light showed passivation of the Si electrode and activation of the passive electrode. Passivation occurred only with anodic currents  $i_a < i_{a \max}$  at all KOH concentrations ( $10^{-3}$  - 20 N). In n-Si, the potential  $\phi$  becomes more negative, in p-Si more positive. The rate of passivation is inversely proportional to the time of exposure and increases as the potential and light intensity increase.  $Z = k_2 \exp(i_{a \max} - i_a)$ , where  $i_{a \max} = k_3 i_{s-d}$  ( $i_{s-d}$  - self-dissolution current) holds for the number Z of absorbed light quanta. Complete photoactivation occurs only at the beginning of the passive state at  $\phi = 100-300$  mv. At  $\phi = 400-600$  mv, activation is incomplete. The potential range of complete activation is broadened in 10 N KOH by a rise of

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Characteristics of the photochemical ...

S/020/62/145/003/011/013.  
B101/B144

temperature. In dilute solutions, a narrow range of activation occurred at 1N KOH and 60°C only. To find a relation between these effects and the acceptor or donor properties of oxygen, the resistance R, capacitance C, and photoeffect  $\Delta V_p$  were measured as a function of  $\psi$  at a-c. (0.2 - 100kc/mc) (Fig. 3). Conclusions: Light irreversibly changes the type of bond of oxygen adsorbed on the Si-KOH interface. When the OH<sup>-</sup> ions are discharged,

dipoles form:  $\text{Si} \begin{matrix} \text{OH} \\ \text{OH} \end{matrix} + \text{OH}^- \rightarrow \text{Si} \begin{matrix} \text{O}^- \\ \text{OH} \end{matrix} + \text{H}_2\text{O}$  which cause an exponential decrease of  $i_{s-d}$ . At a high anodic potential, the holes recombine:  $\text{Si} \begin{matrix} \text{O}^- \\ \text{OH} \end{matrix} \rightarrow \text{Si} \begin{matrix} \text{O}^- \\ \text{OH} \end{matrix}$ . Photopassivation or photoactivation sets in as oxygen acts either as acceptor or donor for electrons. There are 3 figures. The English-language reference is: G. Heiland, Diss. Farad. Soc., no. 28, 168 (1959).

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)  
Card 2/3



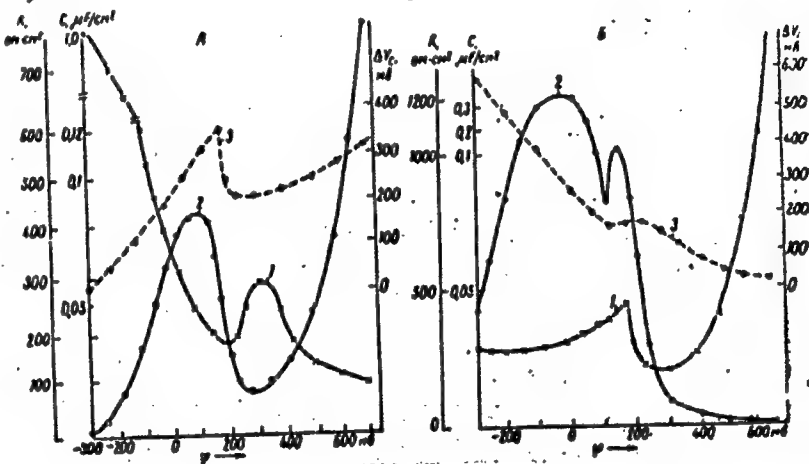
Characteristics of the photochemical ...

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B101/B144

PRESENTED: April 4, 1962, by A. N. Frumkin, Academician

SUBMITTED: March 3, 1962

Fig. 3: (1)  $C=f(\varphi)$ ,  
( $\mu F/cm^2$ ); (2)  $R=f(\varphi)$ ,  
( $ohm \cdot cm^2$ ); (3)  
 $\Delta V_o = \Delta V_p = f(\varphi)$ ,  
(mv). (A) for n-Si;  
(B) for p-Si.



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**Tricalcium phosphate and its thermal properties.** N. V. Britko and V. K. Kabanovskii. *Izv. Akad. Nauk S. S. R., Otdel Tekh. Nauk* 1957, No. 4, 479-481; *Khim. Refr. Abstr.* 1, No. 4-A, 21(1958).—The heat capacities of  $\text{Ca}_3(\text{PO}_4)_2$  were detd. at 297.9° to 1297.7° (Soudard and Miller, cf. C. A. 29, 7170°, detd. its heat capacities from -252° to +25°). The measurements were made with a Co calorimeter. The percentage error was  $\pm 0.3\%$  of the av. heat capacity. The following equation can be used for temp. up to 1500°:  $C_p = 45 + 4.25 \times 10^{-5}T$ . From exptl. data a no. of thermodynamic consts. for  $\text{Ca}_3(\text{PO}_4)_2$  were detd. The exact polymorphic transition temp. was located between 1005° and 1125°. Other investigators gave it at between 1000° and 1200°. The heat effect of the transition of the  $\text{Ca}_3(\text{PO}_4)_2$  modifications is 4500 cal./mol. The studies are not only of theoretical interest, but are useful for technological calcns. of a no. of thermal processes taking place with  $\text{Ca}_3(\text{PO}_4)_2$ .

W. R. Hearn

458-554 METALLURGICAL LITERATURE CLASSIFICATION

BC

A-1

Stability and volatility of tin oxides. V. K. Verslovskii *J. Appl. Chem. Russ.*, 1943, 16, 397-410.—The v.p. of  $\text{SnO}$  over the system  $\text{SnO}_2 + \text{Sn}$  as  $2\text{SnO}$  (l) is measured by the effusion method between  $722^\circ$  and  $813^\circ$ . From these results and published thermal data the energy, enthalpy, and entropy changes associated with reaction (1) are calc. for various temp.  $\text{SnO}$  is stable between  $\sim 80^\circ$  and  $\sim 380^\circ$ . Its entropy calc. from spectroscopic data agrees with that found from thermal measurements. J. J. H.

AD-554 METALLURGICAL LITERATURE CLASSIFICATION

VESHLOVSKIY, V.M.

Determining the building characteristics of plastic clayey  
soils according to their physical properties. [Trudy]  
NIIOSP no.42:5-17 '60. (MIRA 13:6)  
(Soil mechanics)

VESELOVSKIY, V.M.; GORBUNOV-POSADOV, M.I.; SINEL'SHCHIKOV, S.I.

Concerning the tables of soil properties expressed numerically.  
Osn., fund. i mekh. grun. 4 no.2:24-25 '62.

(Soil mechanics--Research)

VESELOVSKIY, V.M.

Automatic equipment for measuring alcohol. Spirt. prom. 25 no.7:37  
'59. (MIRA 13:2)  
(Alcoholometry)

VESELOVSKIY, Vitaliy Naumovich; MASLINA, M.N., red.

[Philosophical significance of the conservation of matter and motion] Filosofskoe znachenie zakonov sokhraneniia materii i dvizheniia. Moskva, "Mysl'," 1964. 142 p.  
(MIRA 17:6)

**"APPROVED FOR RELEASE: 09/01/2001**

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**APPROVED FOR RELEASE: 09/01/2001**

**CIA-RDP86-00513R001859620003-7"**

VESELOVSKIY, V.N., inzh.

Certain problems concerning the repair of asynchronous motors.  
Energetik 10 no.5:5-6 My '62. (MIRA 15:5)  
(Electric motors, Induction)

VESELOVSKIY, V.N.

Electrochemical investigation of anode reactions. MG  
V. N. Veselovskiy (Izv. Akad. Nauk SSSR, 1968, 47-50) (in Russian). V. Has used methods of determining the spectral sensitivity of the photoelectrochemical effect on the electrode, and the dependence of the photoelectrochemical current on the potential, to investigate the mechanism of the anode reactions on Zn in aq.  $H_2SO_4$  and Pb in acid and alkali soln. — O. V. E. T.

AA  
M/T

VESELOVSKIY, V.N., kand.tekhn.nauk

Determining compactness of clay soils of plastic consistency.

[Trudy] NIIOSP no.33:28-42 '58.

(MIRA 11:9)

(Clay--Testing) (Soil mechanics)

L 61415-65 EXT(m)/ENG(s)-2

ACCESSION NR: AF5019106

UR/0286/65/000/012/0127/0127

AUTHORS: Yurchenko, A. G.; Shevchuk, F. Ye.; Svashnikov, O. V.; Veselovskiy, V. S.; Luzin, I. N.; Shtrom, R. Ya.

TITLE: A device for making cellular concrete. Class 80, No. 172208

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 12, 1965, 127

TOPIC TAGS: construction material, concrete, cellular concrete

ABSTRACT: This Author Certificate presents a device for making cellular concrete (see Fig. 1 on the Enclosure). The device consists of a mixing container mounted on a horizontal hollow roller and carrying an internal endless worm screw. To intensify the degree of concrete mixing, the mixing container is produced in the

1 diagram

ASSOCIATION: none

SUBMITTED: 23Mar:64

ENCL: 01

SUB CODE: MT,IE

NO REF SOV: 000

OTHER: 000

Card 1/2

<p>CO</p> <p>2</p> <p>Comparative investigation of the physical-chemical properties of natural and artificial graphite. I. A. SHAPIRO AND V. N. VIKAR, <i>Mineral. Svo' 6</i>, 205 74(1931); <i>Chem. Zvesti</i> 1931, 11, 1304. — The comparative tests of the elec. cond. of the graphite were carried out at like pressures and with materials of like grain size with the use of the Arrault press (cf. <i>Z. Elektrochem.</i> 23, 107(1917)). The finest graphite dust had a highest elec. resistance than coarser, homogeneous particles. The ash content had only slight influence on the cond. For these measurements grains of 0.27–0.1 mm, a pressure of about 100 atm., and a depth of bed of 5–10 cm. were found most suitable. The samples investigated of petroleum coke and natural and artificial graphite formed a more or less natural series according to elec. resistance beginning with amorphous C and ending with cryst. graphite. For the detn. of the stability of the graphite toward heat air was led over the graphite samples at high temps. and the temp. at which oxidation began detd. This temp. depends on the duration of heating, being lower the longer the heating has continued. Cryst. graphites have practically the same temp. of initial oxidation (700°), amorphous graphite is oxidized first at about 637°.</p> <p>M. G. MINOR</p>	
<p>ASAC-114 DETAIL/OPACAL LITERATURE CLASSIFICATION</p>	
<p>SEARCHED INDEXED</p>	

18

Thermal treatment of Kurel graphite. V. S. V. [unclear]. *Mineral. Svi's 6*, 635-40(1931); cf. Shapiro and V., *Ibid* No. 3(1931).—The allotropic forms of black modifications of C are considered here as due to various degrees of dispersion; this explains the peculiarities of "natural series." In the example of thermal treatment of Kurel graphite this hypothesis was substantiated. The work is continued. CHAS. BLANC

ASB-51A METALLURGICAL LITERATURE CLASSIFICATION

FROM SYNDICATE

FROM BOWLING

FROM BOWLING



EST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p>ca</p> <p>2</p> <p>Mechanism and velocity of combustion of graphite conditioned by temperature.  V. S. YAKHOVICH AND V. N. PRUTZOV. <i>Mineral. Sibir' 7</i>, No. 1, 44-60(1932). -- The  proposed method of detg. the velocities of combustion of graphites from the loss in  wt. of the burning sample at a const. temp. by suspending it in the furnace by a Pt  wire from a balance cannot be used for detg. the relative dispersion, for additional mea-  surements of the surface temps. are required. The ignition points of graphite are  cryst. 625°, artificial 675° and flake 750°. CHAB. BLANC</p>																			
<p>ASB-55A METALLURGICAL LITERATURE CLASSIFICATION</p>																			
<p>197000 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100</p>																			

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*B*

Semi-commercial methods for thermal refining of graphite. V. S. Vaslovskii.  
Mineral. Suir's 7, No. 7-8, 32-44(1932).—Known methods were applied to TERNING OF  
U. S. S. R. graphites.

CHAS. BLANC

ASSOCIATED METALLURGICAL LITERATURE CLASSIFICATION

SUBJECTS										AUTHORS										TITLES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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2

Dispersion of aqueous graphite suspensions and the effect thereof of the addition of sodium hydroxide. V. S. Verbovskiy, *Izvestiya Fiziko-Khim. Izh. Naipm* 1933, 81-81.—Investigations of the stabilizing action of NaOH on aq. graphite suspensions showed that when the dispersion medium was gradually displaced by pure water (by washing the graphite) a stabilization max. was observed. Upon further washing the degree of dispersion decreased as the result of autoagglutination. The course of this phenomenon varied greatly in relation to the ash content and condition of oxidation of the graphite (treatment with  $KMnO_4$ ). The stabilization of graphite suspensions by means of tannin in increasing concentration. Stabilization isotherms and the method of their determination. E. V. Khalayeva, *Ibid.* 91-101.—A method for the quant. investigation of the dispersion of graphite suspensions is described, which was used to det. the effect of the concn. of the stabilizer upon the distribution of particle size in the suspension. Investigation of the effect of tannin concn. on the protective action in a 5% graphite suspension in 0.1 N NaOH soln. showed that increasing the tannin concn. from 0 to 0.07% resulted in a marked stabilization, the most probable particle size falling from 75 to 37  $\mu$  in diam. Further addn. of tannin (to 0.5%) increased the stability only slightly, decreasing particle size to 29-30  $\mu$ . Addn. of the protective colloid beyond this concn. gradually produced a sensitization, the particle size increasing from

ASAC-SLA METALLURGICAL LITERATURE CLASSIFICATION

26 to 36  $\mu$ . Stabilization effect of tannin on suspensions of different kinds of graphite at different  $pH$  values of the dispersion medium. N. N. Serb-Sertina. *Ibid.* 11/2-16.—The stability of Kure and Aliberow graphite suspensions in the oxidized and nonoxidized conditions was detd. by sedimentometric methods both in the absence of tannin and at const. tannin concns. (0.25-0.50%) and at various NaOH concns. of the dispersion medium (from  $10^{-4}$  to  $10^{-2}$  N). In the absence of tannin the greatest degree of dispersion was reached at a NaOH concn. of  $10^{-4}$  N. In the case of oxidized (with chromic acid) Kure graphite, considerably greater stability (or degree of dispersion) was observed during washing than during the reverse process of adding NaOH. In the case of oxidized Aliberow graphite conditions were opposite, the dispersion being greater during the addn. of NaOH than at corresponding stages during the washing out of the alkali. A stabilizing effect was not observed with the nonoxidized graphite. The stabilization of graphite suspensions in nonaqueous dispersion media (hydrocarbons) by polar substances. R. K. Venstrom and B. M. Sereva. *Ibid.* 117-10.—The degree of dispersion of various graphite suspensions in nonpolar liquids ( $C_{10}H_8$  and  $C_{12}H_{10}$  mixts. with other hydrocarbons) was investigated in the presence of various polar, surface-active stabilizers (fatty acids, alcs., amines, phenols). In contrast to their behavior in aq. suspensions, all these simple surface-active substances acted as stabilizers in such nonpolar dispersion media. Traube's rule is useful in predicting the stabilizing power of the compds.

investigated. (The stabilizing power of surface-active substances (protective colloids) and especially of alizarin red. P. A. Reinhardt and N. N. Serb-Serikova. *Ibid.* 131-43; *Chem. Zvest.* 1935, II, 2488-9. -- The usefulness of the methods of bubble and drop stability in aq. solns. of stabilizers for judging the stabilizing efficiency was investigated with the special example of alizarin red. Specifically, the action of alizarin red as an emulsifier (in the emulsification of  $C_{12}H_{10}$  and  $Hg$  in aq. solns.) in relation to the  $\sigma_H$ , the surface activity of the alizarin on the liquid boundary surface (water-benzene), the adsorption on graphite from aq. soln., in which satn. is reached at very low concn., and the stabilizing action of alizarin red on aq. graphite suspensions were investigated. M. G. Moore

18

Systematization of Soviet graphite industry. V. S. Vysotskiy. *Mineral Smelting*, No. 2, 27-30(1933).— Improved and standardized methods in refining graphite from domestic deposits and development of their use in industries are recommended.

CMAA BLANC

ASB-SLA DEPARTMENTAL LITERATURE CLASSIFICATION

18

CP

Investigation of graphite deposits of Koginsk on the River Nishali Tugush. V. S. VASLOVSKI AND V. K. CHAKOVSKI. Mineral. Suv'e B, No. 2, 36-38 (1933).—The chem. and phys. properties are given.

CHAR. BLAW

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

12

Graphite deposits near Pottavka. I. I. Subolev and V. S. Yezlovskii. *Mineral. Sbir's B.* No. 7, 45-51 (1933).  
The chem. and phys. properties of the graphite and the results of a geological survey are described. C. Blanc



18

ca

Products of thermal running of graphite and graphitized coal. V. S. Vasylovskii and V. S. Levine. *Mineral. Soiz's* 8, Nov. 8-9, 25-3(1933); cf. C. A. 26, 3479. — The dispersion of thermally refined graphites and graphitized anthracite was indirectly detd. by the velocity of combustion and elec. cond. The results obtained in the use of the products in arts and industry are discussed. Chas. Blanc

ASS. SLA METALLURGICAL LITERATURE CLASSIFICATION

ca

21

THE THEORY OF THE PRODUCTION OF ARTIFICIAL GRAPHITE BY MEANS OF THE GRAPHITIZATION OF COAL. V. S. VESKOVSKIY, and V. N. PERTSOV. *J. Phys. Chem.* (U. S. S. R.) **7**, 557-73(1934); cf. *C. A.* **28**, 3267<sup>1</sup>.—Data are given for the graphitization of various anthracite and bituminous coals. The process is considered as a thermal recrystallization. The process is considered as a thermal recrystallization, with the course of the free surface energy,  $\gamma = 2\sigma/V$ , as a measure of the tendency. On this basis the effect of graphitization of various mineral admixtures is discussed. Data are given for the effects of  $\text{CaO}$ ,  $\text{B}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$ , and  $\text{SiO}_2$  in various amounts, on the sp. elec. cond. and on the temp. of combustion of coals. The temp. required for 35% combustion in 10 min. decreases with the addition of mineral matter up to a certain limit for each substance and is then constant. At the same time the sp. elec. cond. increases. The properties of the products of graphitization of various coals depend on the degree of orientation of the constituent crystals; only anthracites can give acety "oily" graphite.

F. H. RATHMANN

2

CA

DISPERSE STRUCTURE. I. Systematic. V. S. Vasil'ev. *J. Phys. Chem. (U. S. S. R.)* 3, 677-81 (1954).—A review discussion of the composition, size, habit, orientation, intercellular spaces, bonds between the structural elements and parameters of crystals. II. X-ray investigation of the disperse structures of graphite substances. V. S. Vasil'ev and K. V. Vasil'ev. *Ibid.* 1953-55; cf. C. A. 20, 24167.—On the basis of results of x-ray investigation of the disperse structures of graphite substances, graphitic structures are classified genetically. Fourteen x-ray photographs of graphites, anthracites and coals of various origins are given. Fibrous structure results from rapid formation from the gas phase and is found in natural and some artificial graphites. Axial, radial and spheroidal structures are also found. Intermediate is the cluster structure in pergamite. Finally comes the chaotic structure. The temp. of formation is discussed as a factor of crystal size. *Kimo Hanninen*

ASB-55A METALLURGICAL LITERATURE CLASSIFICATION

18

Graphite from cast-iron slag. V. A. Vasilovskii.

<sup>1</sup> *Mineral. Sibir'sk. No. 4, 22-5(1984).*—Flaky graphite, melted for production of crucibles, was obtained from cast-iron slag by sifting and flotation. The product contains 8% ash and can be freed from Fe with HCl.  
Chas. Blaro

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

GROUP	SECTION	SUBSECTION	SECTION	SUBSECTION
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18

ca

Experiments in industrial thermal treatment of graphites and coals. V. S. Vezelovskij and E. P. Chalukhin. *Mineral. Sibir'sk. No. 5, 20-8(1934)*; cf. C. A. 28, 3879; 27, 3782.—The results of thermal treating of Kurvsk graphite and anthracite are determined. Chas. Blanc

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1930-1934

1935-1939

1940-1944

1945-1949

1950-1954

1955-1959

1960-1964

1965-1969

1970-1974

1975-1979

1980-1984

1985-1989

1990-1994

1995-1999

2000-2004

2005-2009

2010-2014

2015-2019

2020-2024

2025-2029

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ca

Effect of the surface tension of an intermolecular liquid on the formation of structure in silica gel. Voth-Arnsov: *sil and A. Selyare. J. Phys. Chem. (U. S. S. R.)* 6, 112 (1952).—According to  $\sigma$ , without loss of water has an efficient negative permeation, but if liquid is lost, the adsorptive properties are destroyed. Above  $60^\circ$  the cell structure changes. Ash silica gels have a firmer structure than acid gels. Comcn. of  $\text{SiO}_2$  in the original hydrogen aging and washing after beginning of syneresis, have little effect.

F. H. Rathmann

1ST AND 2ND DIGITS										3RD AND 4TH DIGITS									
<p>Ca</p> <p><b>The technology of graphite.</b> V. S. Veselovskii, V. N. Pechov and L. V. Lyulin. <i>Trädf. All-Union Sci. Research Inst. Econ. Mineral.</i> (U. S. S. R.) No. 78, 170 pp. (English summary)(1935).—An exhaustive review, with many references, is given of the theory and methods of graphite production and use. H. M. Leicester</p>																			
<p>ALB-51A METALLURGICAL LITERATURE CLASSIFICATION</p>																			
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VESELOVSKIY Vsevolod Stepanovich.

Carbon: diamonds, graphites, and coals; methodology of investigation. Moskva,  
Glav. red. geologo-razvedochnoi i geodezicheskoi lit-ry, 1936. 175 p. (50-48634)

QD473.V47



Mechanical properties of powders. (A) Influence of capillary pressure on drying of clay.

6-I-9

V. S. Vassilov and I. A. Sotirov. (B) Relationship of the mechanical properties of clay to its state of aggregation. V. S. Vassilov and V. M. Pashov. (C) Effect of moisture on the mechanical properties of clay paste. V. M. Pashov (Kolloid. Zhurn., 1958, 2, 417-423, 607-613, 673-677). (A) The capillary pressure of liquid contained in the pores of a paste tends to diminish its volume shrinkage during drying of aq. clay paste is greater at 40° than at 70°, and also > in vapours of  $\text{NH}_4\text{Cl}$  or  $\text{EtOH}$ . The influence of capillary-active substances is more marked when NaOH is added to the paste, but less so when the clay is peptized by  $\text{Na}_2\text{SiO}_3$ .

(B) Variation of the rate and vol. of sedimentation of clay suspensions and of the strength ( $\delta$ ) and deformability ( $\Delta$ ) of clay pastes with the amount of NaOH or  $\text{Na}_2\text{SiO}_3$  added is measured. The rate of sedimentation and  $\delta$  show a min., and the vol. of sedimentation and  $\Delta$  show a max., in 0.1-0.2% NaOH solution.

(C) The effort,  $f$ , necessary for cutting through a clay paste cylinder, and the max. compression,  $\delta$ , of a clay paste sphere which does not cause cracks, are measured.  $\delta$  increases linearly, and  $f$  decreases hyperbolically, with increasing  $\text{H}_2\text{O}$  content. The relationship of  $\delta$  and  $f$  to the thickness of liquid layer between the clay particles is discussed. J. J. B.

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CA

Disperse structure. III. Structure of the disperseoids of higher-order silicates. V. S. Mosolovskii. *J. Phys. Chem.* (U. S. S. R.) 7, 911-17(1936); cf. *C. A.* 29, 3891<sup>1</sup>.—A structural-genetic series is set up for chalcidony. IV. X-ray studies of the structure of silicates. K. V. Vasil'ev and V. S. Veshkovskii. *Ibid.* 918-23.—Plastic deformation is widespread among natural quartz monocrystals. The presence of  $\alpha$ -cristobalite in opal, diatomite, tripoli, etc., indicates that the former is very widespread in nature. F. H. Rathmann

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND INDEX										3RD AND 4TH INDEX									
PROCESSING AND PROPERTIES INDEX																			
<p><b>BC</b></p> <p>Adherence of bubbles to solid surfaces. V. B. VERNIKOV and V. N. PASTOROV (J. Phys. Chem. Russ., 1956, 6, 215-220).—Along the line <math>l</math> of contact between solid, liquid, and air a tension exists which is similar to surface tension. It represents a force tending to decrease the perimeter of the bubble along <math>l</math>; this force <math>\propto 1/\text{radius of curvature of } l</math>. The observed dependence of the contact angle on the radius agrees with this view. The friction involved in moving bubbles on the surface, and the adherence of bubbles in aq. solutions to glass, mica, talc, graphite, Hg, and paraffin, were also measured. J. J. B.</p>																			
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1ST INDEX										2ND INDEX									

157 AND 140 CROSS  
PROCESSES AND PROCESSED WOOD

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Heating apparatus in laboratory practice. V. S. Yezhov.  
and I. V. Shumaykov. Trans. AN-URSS Sci.  
Research Inst. Geol. Mineral. No. 96, 130 pp. (1936).  
--A review of theory and practice of gas and elec. sur-  
veys and of heat and temp. measurements. H. L. M.

ASB-55A METALLURGICAL LITERATURE CLASSIFICATION

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001537 ONE ONLY 151

**CA**

Graphite. V. N. Vorobyski and V. N. Postare. Russ. *AN*, 1935, Sept. 30, 1938. Graphite made from anthracite is dried from unchanged anthracite by immersion in water; the graphite settles to the bottom.

ABSTRACT DETAGLUNGICAL LITERATURE CLASSIFICATION

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● 2009年10月1日起，凡在中华人民共和国境内销售货物或者提供加工、修理修配劳务以及进口货物的单位和个人，均应按照《中华人民共和国增值税暂行条例》及实施细则缴纳增值税。

॥ श्रीगणेशाय नमः ॥

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CA

Artificial graphite. V. N. Veselovskii. *Izvest. Akad. Nauk SSSR, Ser. Khim. Nauk*, No. 146, 35-51 (in English, 51-5) (1959).—The development of artificial graphite manu. in Russia is outlined. Expts. on anthracite graphitization produced several tons for testing purposes in various branches of industry. The best product was obtained from Donetsk anthracite, of finely schistose structure and having 6-8% ash. Quality of the product is improved by reducing in a ball mill. Calcus. of a graphitization furnace are made. H. Z. Kamich

1ST AND 2ND PAGES										3RD AND 4TH PAGES									
PROCESSES AND PROPERTIES INDEX																			
<p>Furnace for the continuous preparation of graphite.  V. S. Veselovskii and V. N. Pertsov. Russ. 67,607,  Sept. 30, 1940; addn. to Russ. 63,813 (C. A. 26, 13279).  Constructional details.</p>																			
<p>ASH-SLA DETAILING LITERATURE CLASSIFICATION</p>																			
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4203. IGNITION TEMPERATURE OF COALS AS INDICATION OF THEIR TENDENCY TO SPONTANEOUS COMBUSTION. Veselovskii VS and Terpogosova, EA (Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk (Bull. Acad. Sci. U.S.S.R., Sect. Tech. Sci.), Aug. 1950, 1198-1203). Experiments were carried out in connection with mine fires, using Kurnakov's apparatus. Pulverized coal samples were placed in an electric furnace and the temperature rise in coal and furnace were recorded separately, automatically. At first air or gaseous oxygen was introduced into the furnace, but since the ignition temperatures recorded were inconsistent, oxygen was obtained instead from molten sodium nitrate. Ignition temperature was found to give a good indication of the tendency to spontaneous combustion of brown coals, but not in the case of hard coals. In their case, account has to be taken to the different tendencies of otherwise similar coals to slight low temperature oxidation, and consequent lowering of ignition